

## Assessment of Malocclusion Prevalence and Different Variables Associated with it in Children Aged 10-12 Years Belonging to Hyderabad City, Telangana, India

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### Original Research Article

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#### Article History

*Received: 14.11.2017*

*Accepted: 22.11.2017*

*Published: 30.11.2017*



**Abstract:** Malocclusion is found to be a universal dental problem affecting children all ages. However, the perception of people about malocclusion depends on geographical location, cultural background and concern about facial appearance. But, in developing countries like India the problem has become more drastic. To assess the prevalence of malocclusion and different variables associated with it in children aged 10 to 12 years in Hyderabad city of Telangana, India. A cross sectional study was conducted among children aged 10 to 12 years visiting Outpatient Department setting (OPD) of our institution. A total of 4732 children were included in the study that fulfilled the inclusion criteria. Different variables associated with malocclusion were recorded. The World Health Organization (WHO) criteria for oral health assessment were used to examine the oral status of children. The data was tabulated and analyzed using Chi-square test. Prevalence of Malocclusion was 83.3% among which 54.1% were boys and 45.9 % were girls. Angles class I malocclusion was most prevalent followed by class II and class III. The most prevalent variable associated with malocclusion was deepbite followed by protrusion of teeth and crossbite. There is high prevalence of malocclusion among children aged 10 to 12 years in Hyderabad city of Telangana state. Malocclusion has an impact on the overall oral health and quality of life of the children. Thus preventive and interceptive measures should be implemented at an early developmental stage.

**Keywords:** 10-12 years old children, Prevalence, Malocclusion, Variables of malocclusion

## INTRODUCTION

Well-aligned teeth and a pleasing smile, at all social levels reflects positive status and well-being [1]. A balanced facial feature is much more pleasing and appealing in majority of races and sexes rather than irregular or protruding teeth which also gives a reflection of negative status [2,3]. Any mal-relationship between the arches in any of the three planes or anomalies in tooth position beyond normal limits is defined as malocclusion. Preventive or interceptive measures may be used at an early stage to prevent the incidence or intercept developing malocclusions. Therapeutic orthodontic measures and preventive planning may be done by early recognition of malocclusion in particular population thereby preventing future orthodontic therapy. This also helps in providing public health services to children at a developing stage itself [4].

India, a diverse and vast subcontinent shows large variation in prevalence of malocclusion in different regions of our country. Variations in ethnicity, nutritional status, religious beliefs, diet may be attributed to the variations in prevalence of malocclusion. The prevalence of malocclusion in India is found to be 20 to 43% [5]. Presently, there are no earlier studies on prevalence of malocclusion in children aged 10-12 years in Telangana state. Therefore, the present study was undertaken to determine the prevalence of malocclusion and associated variables in Hyderabad city of Telangana state.

### Aims and objectives

- To assess the prevalence of malocclusion in 10 to 12 years old children visiting our institution.

- To identify the proportion of various types of malocclusion.
- To assess the proportion of different variables of malocclusions like crossbite, open bite, protrusion of teeth, deep bite and rotation of teeth.

**MATERIALS AND METHODS**

A study was conducted in Hyderabad city of Telangana state to assess the prevalence of malocclusion in 10 to 12 years old children visiting of our institution for seeking treatment for irregularities of orthodontic origin. A total of children 4848 were examined during the month of July and August 2017 among which 4732 children satisfied the inclusion criteria.

Informed consent was obtained from the parents/guardians after explaining about the involvement of their children in the study. Ethical clearance was obtained from the Ethical Committee of Government Dental College and Hospital, Hyderabad for conducting the study. The study was conducted as per the World Medical Association Helsinki Declaration.

**Inclusion criteria**

- Subjects in the age group of 10–12 years
- Subjects who had all the permanent first molars erupted.

**Exclusion criteria**

- Previous history or ongoing orthodontic treatment
- Uncooperative child
- Medically compromised child.

**Examination of the children**

The children were examined using World Health Organization (WHO) criteria for oral health assessment. Examination of each child was done using mouth mirror, probe and explorers. A single examiner carried the oral examination of each child. Occlusal relationship was evaluated at centric occlusion. The variables which were recorded included crossbite, open bite, deep bite, protrusion of teeth and tooth rotations. The normal occlusal group included children with class I molar relationship, normal overbite and overjet (<3mm), proper alignment and no gross irregularities.

The statistical software Statistical Packages for the Social Sciences (SPSS) 17 was used in present study. Chi square test was used to analyse the prevalence of malocclusion which was represented in proportions and P value less than 0.05 was considered as statistically significant.

**RESULTS**

In the present study, the prevalence of malocclusion among the 4732 children examined showed that boys had more prevalence of malocclusion than girls. The age and gender distribution of the children examined are shown in Table 1. Malocclusion was showed by 83.3% of the total population examined among which 69.8% presented with class I, 9.3% with class II and 4.1% with class III malocclusions. Class II Division 1 was found to be more prevalent than Class II Division 2. There was no statistically significant distribution of subjects based on gender and Angles class of malocclusion (Table 2).

Among the total children examined, normal overjet and overbite (<3 mm) was shown by 76.4 % and 64.1%, increased overjet and overbite (>3 mm) by 23.2% and 35.6% respectively. Reverse overjet was shown by 4.2% and open bite by 0.29% which was found to be statistically significant based on gender as shown in Table 3 and 4. Among the 7 children who presented with open bite, 6 children had skeletal and only one had dental type of open bite (Table 5).

Crossbite was found to be present in 7.2% of the total children. The distribution of different types of crossbite was as shown in Table 6. The most commonly affected teeth were single or multiple anterior teeth. Among the single tooth crossbite, maxillary right lateral incisor followed by left lateral incisor is mostly found to be in crossbite.

Tooth rotations was found to be the most common malocclusion in the present study which was shown by 3.25% of the total children examined (Table 7). Most commonly rotated teeth were lateral incisors (64.9%). The present study showed that the variables of malocclusion examined presented with overall distribution of deep bite being the most prevalent followed by increased overjet and crossbite.

**Table-1: Age and Gender distribution of the children examined**

AGE( In Years)	MALE (%)	FEMALE (%)	TOTAL (%)
10	716 (52.6)	644(47.4)	1360(28.7)
11	668(53.7)	576(46.3)	1244(26.3)
12	1178(55.4)	950(44.6)	2128(45.0)
TOTAL	2562(54.1)	2170(45.9)	4732(100)

**Table -2: Distribution based on gender and Angles class of malocclusion**

OCCLUSION	MALE (%)	FEMALE (%)	TOTAL (%)
Normal	372(47.1)	420(52.9)	794(16.7)
Class I	1822(55.1)	1482(44.9)	3304(69.8)
Class II Div 1	254(60.8)	164(39.2)	418(8.85)
Div 2	6(25.0)	18(75)	24(0.5)
Class III	106(55.2)	86(44.8)	192(4.1)
Total	2562(54.1)	2170(45.9)	4732(100)

**Table-3: Overjet and Gender distribution**

OVERJET	MALE (%)	FEMALE (%)	TOTAL (%)
Normal	1858(51.4)	1756(48.6)	3614(76.0)
Increased	692(63.0)	406(137.0)	1098(23.2)
Reverse	12(60)	8(40.0)	20(0.4)

**Table-4: Overbite and Gender distribution**

OVERJET	MALE (%)	FEMALE (%)	TOTAL (%)
Normal	1550(51.0)	1484(49)	3034(64.1)
Increased	1008(59.9)	676(40.1)	1684(35.6)
Open bite	4(28.5)	10(71.5)	14(.29)

**Table-5: Open bite and Gender distribution**

OPENBITE	MALE (%)	FEMALE (%)	TOTAL (%)
Skeletal	2(16.7)	10(83.3)	12(85.7)
Dental	2(100)	-	2(14.3)
Total	4(28.5)	10(71.5)	7(100%)

**Table- 6: Cross bite and Gender distribution**

CROSSBITE	MALE (%)	FEMALE (%)	TOTAL (%)
Complete(Anterior and Posterior)	4(100)	-	4(1.2)
Anterior Complete	8(50)	8(50)	16(4.6)
Single tooth	124(54.6)	104(45.6)	228(66.3)
Unilateral Posterior	34(53.1)	30(46.8)	64(18.6)
Anterior and Unilateral posterior	20(62.5)	12(37.5)	32(9.3)
Total	190(55.23)	154(44.7)	344(100)

**Table -7: Tooth rotation and Gender distribution**

VARIABLE	MALE (%)	FEMALE (%)	TOTAL (%)
Tooth rotation	68(44.2)	86(55.8)	154(3.25)

**DISCUSSION**

The most common problem worldwide today seems to be one associated with teeth i.e. Malocclusion. It has been found to cause psychological and psychosocial problems, oral function dysfunction, impaired aesthetics, difficulty in mastication, swallowing and speech, periodontal disease and mostly increased susceptibility to trauma [6].

Numerous studies have been published describing the prevalence of malocclusion and its different types [7-9]. A great variability is observed in distribution of different types of malocclusions even in a population of same origin [10]. Many cross sectional studies have been attempted previously to examine the

malocclusion in different populations representing Indian population [6]. But no studies have been reported on Telangana state of India. Hence the present study was conducted in the children aged 10-12 years in Hyderabad city being the capital of Telangana to report the prevalence of Malocclusion.

In the present study, 4848 children in the age group of 10-12 years visiting our institution were examined during the month of July and August 2017 among which 4732 children were included in the study. Among the 4732 children, 2562 were boys and 2170 were girls. Angles classification of malocclusion was used to evaluate the occlusal status of the children in the present study. The prevalence of malocclusion was

reported to be 83.3% among the 4732 children examined. This finding is in similarity to studies done by Narayan *et al.* [6] and Kaur *et al.* [11]. But the studies conducted by Hemapriya *et al.* [12] and Trehan *et al.* [13] reported a lower prevalence compared to the present study.

On examination of different classes of malocclusion, it was found that Angles Class I malocclusion was the most prevalent which was shown by 69.8% of the population. Similar findings were shown in studies done by Narayan *et al.*[6] Trehan *et al.*[13] Das and Reddy[14]. However lesser prevalence rates was shown in studies done by Phaphe *et al.* [15] and Vibhute *et al.*[16]. The second most prevalent malocclusion was Angles Class II malocclusion shown by 9%. Narayan *et al.* [6] Sridharan *et al.* [17] Muppa *et al.*[18] confirmed similar findings. The least prevalent malocclusion was Angles Class III malocclusion shown only by 4%. This finding is in accordance to Narayan *et al.* [6] Vibhute *et al.*[16]. The prevalence of different classes of malocclusion showed no significant gender difference.

In the present study, 76.4% of the children presented with normal overjet of less than 3mm. Increased overjet of greater than 3mm was shown by 23.2% of the children which was found to be lesser when compared to study done by Hemapriya *et al.* [12] but studies by Siddegowda and Rani [19] reported lower prevalence rates in Karnataka state. Increased Overbite was shown by 35.6% of the total population which is found to be lesser prevalent than Siddegowda and Rani study [19]. Similar prevalence rates were shown in studies done by Narayan *et al.* [6], Nainani and Sugandh [20]. Phaphe *et al.* [15] reported a lower prevalence than that in the present study.

Anterior open bite was reported in only 0.29% in the present study. Contradictory results were found in study done by Nainani and Sugandh [20] in Nagpur which showed high prevalence rate of 4%. Crossbite was reported in 7.1% of the children which is in accordance with Nainani and Sugandh [20] study. Higher prevalence of crossbite was shown in study by Phaphe *et al.*[15]. Anterior cross bite was present in 4.25 % which is similar to studies of Narayan *et al.* [6] and Muppa *et al.*[18] Tooth rotation was reported in 3.25% of the children. Studies done by Vibhute *et al.* [16] and Nainani and Sugandh[20] showed high prevalence rates. The most commonly rotated teeth were maxillary right lateral incisor followed by mandibular right lateral incisor.

In this era of evidence based dentistry, it will be very useful for the preventive as well as early interceptive measures for early correction of the malocclusion, thereby preventing future complex and

complicated treatment protocols in the permanent dentition [6]. The findings of the present study will be helpful in identifying the most prevalent variables of malocclusion that may be prevented or intercepted at the developing stage itself.

#### Clinical significance

- Serves as a first step for planning, and taking necessary preventive measures followed by interceptive care. Thus treatment needs of patients can be taken care of at an early and developing stage itself.
- Serves to pose malocclusion as a public problem in era of evidence based dentistry thereby creating awareness among people raising concern for dental appearance.
- Serves as a strongest motivator for orthodontic treatment improving the quality of life (QoL) of children.

#### Limitations

The present study was conducted in subjects visiting our institution only and everyone coming with orthodontic problem was included in the study which might not be representing the exact prevalence of malocclusion. Also long time duration studies might be needed in near future.

#### CONCLUSION

The following conclusions were arrived at from the present study

- Prevalence of malocclusion in children aged 10-12 years in Hyderabad city of Telangana state was found to be 83.3%. Class I malocclusion was the most prevalent type which was shown by (69.8%) of the population, followed by class II malocclusion (9.3%), class III malocclusion (4.1%). In Class II malocclusion, division 1 was more prevalent than division 2 which was found to be 8.85% and 0.5% respectively.
- Prevalence of malocclusion was found to be more in males. However this difference was not found to be statistically significant. Females showed more concern for malocclusion owing to esthetic reasons than males
- Prevalence of different variables of malocclusion revealed that deepbite was most prevalent malocclusion followed by protrusion of teeth and crossbite

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